

Claim 4 (now amended claim 1) stands rejected under §103 on the basis of Tani et al '339., Okuyama et al., '607 and Yamamoto '609. Applicants respectfully traverse this rejection for the following reasons.

In addition to improving reproduction output and S/N ratio, the present invention significantly reduces noise, while using a hard substrate such as glass or silicon. The hard substrate is useful because it increases shock resistance of the magnetic disk.

Further, since a Cr-based underlayer is inserted between the glass substrate and the NiP-based underlayer, the bonding strength between the substrate and the NiP-based underlayer is significantly increased. The increased bonding strength is particularly effective to prevent peeling of the NiP-based underlayer from the substrate during subsequent texturing of the NiP-based underlayer, thereby enabling a stable texturing process. This happens because Cr of the underlayer can easily and strongly bond through oxygen of the glass substrate to the substrate. Also, NiP has a good compatibility with Cr, while it has poor compatibility with glass. More particularly, the NiP-based underlayer can exhibit excellent bonding strength to the Cr-based underlayer when formed by sputtering the NiP, as recited in amended claim 1.

The Examiner recognizes that the '339 patent discloses a magnetic recording medium of the present invention except for the magnetic layer, and the magnetic layer is disclosed in the '607 patent, previously filed by the inventors of the present invention. The glass substrate having nonoriented irregularities is disclosed in '339 patent, but the '339 patent does not teach formation of a Cr-based underlayer over a glass substrate to increase bonding strength between the glass substrate and the NiP-

based layer. As illustrated in the drawings, a nonmagnetic metallic film (NiP) 8 is directly deposited over a glass substrate 7 to form a nonmagnetic substrate disk 2.

Contrary to this, according to the present invention, as recited in amended claim 1, a Cr based underlayer (first underlayer) is sandwiched between the glass substrate and the NiP-based underlayer (second underlayer) to prevent peeling of the NiP-based underlayer during the subsequent texturing process. Moreover, if the NiP-based underlayer is formed upon sputtering, such peeling can be more effectively prevented because of the resulting strong bonding between the NiP-based underlayer and the Cr-based underlayer.

Applicants agree with Examiner's observation that the '339 patent teaches texture treating in an NiP layer, but it is silent concerning the specific thickness of a p atom % in the NiP layer, which are important to the practice of the present invention, as the Examiner recognizes in paragraph 8 of the Office Action.

With regard to the magnetic layer of the 4- or 5- component metal alloy, the Examiner refers to the '607 patent. However, since the '607 patent is intended to simultaneously attain a high coercive force and a low noise level with a conventional CrMo underlayer, it is not directed to improvement of the underlayer, i.e., use of an NiP underlayer and application of a multilayered structure, as in the present invention.

The '609 patent is different from the present invention because an aluminum disk (not a glass or silicon substrate) is used as a substrate, and an NiP coat layer is obtained by electrolytic or nonelectrolytic metal plating (not sputtering), as is disclosed in column 2, lines 51-54 of the '609 patent. As explained above, sputtering of

NiP is effective to obtain strong bonding through the Cr-base underlayer to the glass or silicon substrate. The NiP plated aluminum disk does not provide any motif for the present invention, because as disclosed on page 5, lines 19-30 of the specification, the present invention uses glass in place of aluminum in the NiP plated aluminum substrate, which does not create a magnetic anisotropy in the circumferential direction. As disclosed on page 7, lines 9-14, the NiP plated aluminum substrate does not ensure a high impact resistance.

For these reasons, applicants traverse this rejection, and request reconsideration and withdrawal.

Claims 1 and 3 stand rejected under §103 on the basis of Tani et al. '339 and Chang et al. '783, and claim 9 stands rejected on the basis of those references and Ross '621. These rejections are also moot in light of the amendment of claim 1. Nonetheless, the additional references will be briefly discussed.

Referring to the '783 patent, the Examiner mentioned that it teaches the surface roughness of the seed (NiP) layer. However, such surface roughness is produced upon oxidation, as disclosed in column 6, lines 28-46 of the '783 patent, whereas according to the present invention, the textured structure is formed upon mechanical treatment, as recited in amended claim 1, and disclosed on page 19, lines 4-10 of the present specification.

The '621 patent teaches a magnetic disk storage medium, but it is different from the present invention, because assuming that an adhesion layer 12 corresponds to the first underlayer of the present invention, a textured film 14 cannot act as a second

underlayer of the present invention. It should be noted that a NiP underlayer 16 is positioned apart from the adhesion film 12. Further, in the '621 patent, the third underlayer of the present invention is missing because a magnetic layer 17 is directly laminated to the NiP underlayer 16.

Further, as disclosed in column 4, lines 48-57 of the '621 patent, a glass substrate 11 has a smooth surface because no irregularities are required due to the presence of an adhesion layer 12. Contrary to this, according to the present invention, nonoriented irregularities are applied to a surface of the glass substrate.

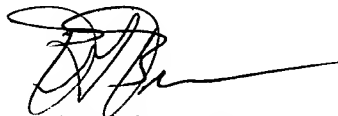
Furthermore, in some embodiments, an NiP underlayer 16 need not be formed, as is disclosed in column 6, lines 1-4 of the '621 patent, whereas an NiP layer is important to the practice of the present invention.

For the foregoing reasons, applicants believe that this case is in condition for allowance, which is respectfully requested. The Examiner should call applicants' attorney to expedite prosecution.

Respectfully submitted

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